AMENDMENTS TO THE SPECIFICATION

[0032] As shown in FIG. 3, [[A]] a biofilm reactor 13 of the present invention has a multi-stage laminated structure in which a pair of first and second biofilm contact layers 2 and 3 are alternately arranged vertically.

[0036] The first and second biofilm contact layers 2 and 3 are made of various contact media such as a fixed fibrous-type contact medium or flowing fibrous-type contact medium. The biofilm is formed by the fibers fixedly attached to the external surface of the panel member.

[0037] A plurality of ~~outlets~~ discharging holes 20-1 are formed through an intermediate diaphragm 20 formed at the bottom of the first and second biofilm contact layers 2 and 3. The ~~outlets~~ discharging holes 20-1 have plate or ball shaped exteriors so that the falling wastewater collides with the ~~outlets~~ discharging holes 20-1 by the fall of water and thus is sprayed around to be in contact the biofilm on the fibers.

[0038] The biofilm ~~contact layers 2 and 3~~ reactor 13 ~~are~~ is formed to have a hopper shape. A through hole is formed through the biofilm ~~contact layers 2 and 3~~ reactor 13 at a designated height so that the wastewater is automatically discharged when the wastewater reaches a designated amount. A nozzle for spraying the wastewater is formed through the top of the biofilm ~~contact layers 2 and 3~~ reactor 13, and a spray control valve for discharging the wastewater to the lower tank is formed through the bottom of the biofilm ~~contact layers 2 and 3~~ reactor 13.

[0042] Particularly, decant water from the precipitator 9 in which the sludge is precipitated or which the wastewater is purified via the biofilm reactor 13 is supplied to the nozzle pipe 1 via first and second circulation pipes [[14]] 5 and 6 by means of the pumping of a circulating pump 10.

[0043] The decant water in the precipitator 9 obtained by removing sludge contained therein by the precipitation and repeated recycling of the biofilm reactor 13 overflows from the precipitator 9 via an overflow wall 12, and is stored in an overflow tank 7. Then, the water stored in the overflow tank 7 in a final purified condition is discharged via an overflow water pipe 7-1. The precipitator 9 and the collecting hopper 4 are each connected to a nitrogen/phosphorous treatment tank 17 to selectively treat nitrogen and phosphorous.

[0048] Further, the wastewater treatment apparatus of the present invention purifies wastewater by means of the natural fall of water, thereby not requiring an oxygen supply device such as a blower. The precipitator 9, the collecting hopper 4, the wastewater connection tank 15, and the nitrogen/phosphorous treatment tank 17 are formed in a hopper shape to discharge sediments.

[0049] As shown in FIG. 6a, an apparatus for treating wastewater according to the present invention is configured in such a way that a plurality of collecting hoppers are connected to the same pipe, which receives the wastewater, to perform, in the following order, an operation, water collection, and a discharge. Each collecting hopper correspondingly installs a biofilm reactor 13 on its upper side. ~~In accordance with another embodiment of the present invention, an apparatus for treating wastewater includes a biofilm reactor 17 with an air contact biofilm 2 or a multi-stage laminated structure of plural air contact biofilms 2, and a titanium reactor 3 located below the biofilm rector 17.~~

[0050] As shown in FIG. 6b, an apparatus for treating wastewater according to the present invention is configured in such a way that biofilm contact medium 33 is stacked in a single or multi stages in a biofilm reactor 13, and a titanium reactor 21 is located below the biofilm reactor 13. An ultraviolet ray lamp [[4]] 22 is located above the titanium reactor [[3]] 21, and fixed to an ultraviolet ray lamp fixture [[5]] 22-1.

[0051] The precipitator [[7]] 9 is located below the biofilm reactor [[17]] 13 so that the wastewater purified via the ~~air contact~~ second biofilm contact layer 3 [[2]] and the titanium reactor [[3]] 21 is fallen down to the precipitator [[7]] 9.

[0052] Alternatively, the titanium reactor [[3]] 21 may be located at the uppermost portion of the biofilm rector [[17]] 13 so that solar heat is used to induce a chemical reaction in the titanium reactor [[3]] 21.

[0053] As the titanium reactor [[3]] 21, titanium may be applied to a porous plate to form a thin film or applied to ball-shaped structures with a diameter of approximately 3 mm to 5 mm.

[0054] In case that ultraviolet ray with a designated wavelength (λ<400 nm) having energy of more than a band gap is irradiated on the surface of TiO_2 of the above-described titanium reactor [[3]] 21, electrons of TiO2 are transferred from a Valence band to a Conduction band, thereby leaving holes at transferred electrons' seats in the valence band.